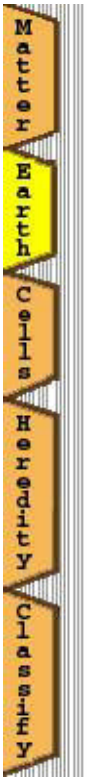


STANDARD 3200-02 Students will compare and contrast the structure of Earth's crust and interior.
OBJECTIVE 3200-0201 Construct and defend a model of Earth's crust and interior.

To observe and compare the rate of crystal growth and crystal size in a model that simulates magma cooling slowly and magma cooling rapidly.

Intended Learning Outcomes:
1a. Make observations and measurements.
5c. Understand science concepts and principles.
6d. Construct diagrams to describe and summarize data.

Background:
Igneous rocks form from molten rock called magma. The rate at which cooling takes place determines the crystal size of the mineral. Intrusive rocks form from lava that cools beneath the earth's surface very slowly and develops relatively large crystals. Extrusive rocks form from magma that reaches the Earth's surface and then cools rapidly. The rapidly cooling magma cools so quickly that crystals do not have time to form and therefore are either not present or relatively small. (Magma that reaches the surface of the Earth is also known as lava.)
Students need to be able to use a microscope and must be able to operate a stopwatch. See safety procedures for using matches.

Time Required:

45 minutes

Summary:
Students will observe both the slow and rapid growth of iodine crystals. They will then compare their observations to the process of lava/magma cooling at different rates.

Materials:

- 2 microscope slides
- student microscope
- eye dropper
- concentrated iodine solution (1Normal recommended)
- match
- pencil and paper
- clock or stopwatch

PROCEDURE

Step 1. Place one drop of iodine on each microscope slide.

Step 2a. Using a stopwatch or a classroom clock, record how long it takes for crystals to form on one microscope slide at room temperature.

Step 2b. Carefully heat the bottom side of the other microscope slide so that the iodine crystallizes rapidly. (The other slide and iodine drop need to crystallize normally at room temperature - see Step 2a). Record how long it takes for crystals to form.

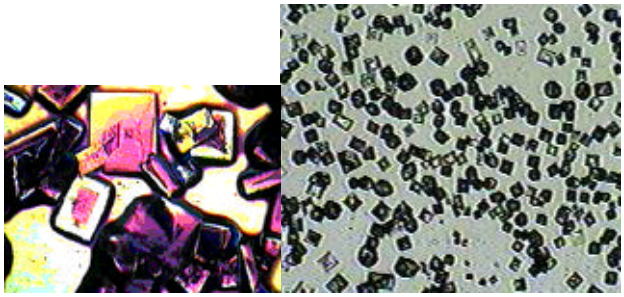
Step 3a. View the slide with the iodine forming crystals at room t temperature (see Step 2a) under the microscope. You should actually be able to see the crystals forming. Make a sketch of some of the crystals you observe through the microscope.

Step 3b. Observe the rapidly cooling crystals using a microscope (see Step 2b). Make a sketch of some of the crystals you observe through the microscope. (Binocular microscope would be preferable but normal compound light microscope works fine.)

*Use the same magnification of crystals for both sketches.

Safety concerns:

 Be sure to keep all Chemical, Heat, and Glassware Safety Rules that are specified by your teacher and in all general laboratory experiences, along with all teacher instructions!



Questions

1. In this activity what represents magma?

2. Which microscope slide best represented:

    Intrusive rock formation?

    Extrusive rock formation?

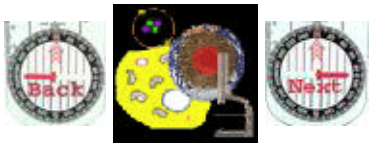
3. How much time did it take for the:

    simulated extrusive rock's crystals to form?

    simulated intrusive rock's crystals to form?

4. If you were in a desert and found a pretty rock, what are some things you might look for to determine if it is an extrusive rock or an intrusive rock?

5. Why do you think that magma inside the Earth's crust cools more slowly than magma on the surface of the Earth's surface?



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